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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Bernd Michaelis

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02/23/2005

Law Offices of Karl Hormann
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Cambridge, MA 02138-2216

EXAMINER

CHAWAN, SHEELA C

ART UNIT

PAPER NUMBER

2625

DATE MAILED: 02/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/995,982

Applicant(s)

MICHAELIS ET AL.

Examiner

Sheela C Chawan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-4 and 11-17 is/are rejected.
- 7) ☒ Claim(s) 5-10 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

2. The subject matter of this application admits of illustration by a drawing to facilitate understanding of the invention. Applicant is required to furnish a drawing under 37 CFR 1.81. No new matter may be introduced in the required drawing.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1 - 4, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe (US.5,031,154), in view of Doi et al. (US. 5,873,824).

As to claim 1, Watanabe discloses a method of recognizing deviations in the shape of the surface of an object from a predetermined shape by detecting measurement values and subsequently processing the measurement values in an artificial neuronal net (abstract, column 2, lines 53- 67), characterized by the steps of:

projecting patterns onto the surface of the object (note, irradiating ultrasonic waves having two mutually different frequencies on the object which is to be imaged (column 2, lines 56- 58);

recording images of the surface (note, recording two mutually ultrasonic waves having different frequencies on the object which is to be imaged (column 2, lines 56- 58)

and the patterns by a matrix camera, which generates a sequence of n images (note, camera generating a sequence of images, column 2, lines 60- 63, column 6, lines 60- 67);

shifting the projected pattern by predetermined values (note, shifting the projected patterns based on the position and rotary angle of the object and reconstruct the image of the object, column 2, lines 63- 66);

defining on the basis of the grey value sequence of individual pixels of the n recorded images at least one number which is characteristic of one of the grey value sequence of a given pixel and of the grey value sequence of the pixel relative to at least

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one grey value sequence of different pixels (fig 8, column 6, lines 40- 67, column 7, lines 1-47);

Watanabe is silent about recalling the neuronal net subsequent to inputting one of the data of the recorded images and the matrix of the at least one characteristic number of the recorded object derived from the image data;

utilizing as significant data of the deviations the comparison between one of the image data and the matrix of the characteristic number of the recorded object derived from the image data and the recall data of the neuronal net.

Doi discloses analysis of radiographs using artificial neural networks, which classify the radiographs into normal and abnormal. The system comprises of :

recalling the neuronal net subsequent to inputting one of the data of the recorded images and the matrix of the at least one characteristic number of the recorded object derived from the image data (column 6, lines 49-60);

utilizing as significant data of the deviations the comparison between one of the image data and the matrix of the characteristic number of the recorded object derived from the image data and the recall data of the neuronal net (column 7, lines 13-24).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Watanabe to include recalling the neuronal net subsequent to inputting one of the data of the recorded images and the matrix of the at least one characteristic number of the recorded object derived from the image data;

utilizing as significant data of the deviations the comparison between one of the image data and the matrix of the characteristic number of the recorded object derived

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from the image data and the recall data of the neuronal net. It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Watanabe by the teaching of Doi in order to make a complete diagnosis is greatly reduced in comparison to using fully connected two-dimensional neural networks and the training time required to train the complete network is reduced (as suggested by Doi at column 2, lines 58- 62).

As to claim 2, Watanabe discloses the method including the step of normalizing the brightness of the sequence of n recorded images (column 6, lines 40- 67, column 7, lines 1-47).

As to claim 3, Doi discloses the method of the comparison between one of the image data and the matrix of the characteristic number of the recorded object derived from the image data and the recall data of the neuronal net further includes the step of forming a difference (column 4, lines 64-67, column 5, lines 1-39).

As to claim 4, Watanabe discloses the method wherein the projected patterns are striped patterns (note, striped pattern corresponds to fig 3, two ultrasonic burst waves, column 5, lines 5-27).

As to claim 11, Watanabe discloses the method, wherein the artificial neuronal net comprises three linear layers (fig 8, artificial neuronal net comprises of three layer, input layer, Hidden layer and output layer, column 6, lines 62 – 68).

As to claim 12, Watanabe discloses the method, wherein one of the three linear layers is a hidden layer containing as many neurons as are required for substantially

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reconstructing all variations in position and form of at least one master part (column 7, lines 20-48).

4. Claims 13 –17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe (US.5,031,154), as applied to the above claims 1- 4, 11 and 12 and further in view of Doi et al. (US. 5,873,824).

Regarding claim 13 Watanabe discloses three-dimensional object imaging system, which are applicable to automatic recognition systems for recognizing three dimensional objects, ultrasonic robot eye.

Watanabe is silent about the weights of the net correspond in the order of the size of the eigenvalues to the eigenvectors of the covariance matrix of one of the image data and the characteristic numbers of at least one master part.

De Vries discloses a signal processing system and method that updates structural parameters of the neural network. The system comprises of:

the method, wherein the weights of the net correspond in the order of the size of the eigenvalues to the eigenvectors of the covariance matrix of one of the image data and the characteristic numbers of at least one master part (column 1, lines 44 – 45, column 4, lines 1-6, 18-27, column 6, lines 47- 58, column 10, lines 27-30).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Watanabe to include eigenvectors of the covariance matrix. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Watanabe by the teaching of De Vries because as n increases, the saving in

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computational steps becomes extremely significant (as suggested by De Vries at column 10, lines 10 – 15).

As to claim 14, De Vries discloses the method, wherein the weights are calculated by one of forming the covariance matrix and subsequent calculation of the eigenvectors and of a suitable learning process (column 5, lines 49-63, 58-63) (e.g. Hebb's learning rule, column 10, lines 31-50).

As to claim 15, De Vries discloses the method, wherein the recall is accomplished by one of a neurocomputer and circuit designed for the task (column 5, lines 37-48).

As to claim 16, De Vries discloses the method wherein only predetermined image data and characteristic numbers from the object and master parts are utilized (column 2, lines 1-10).

As to claim 17, De Vries discloses the method, wherein comparative data between the input data of the artificial neuronal net and the recall data are smoothed by smoothing filters to reduce the effect of interferences in individual pixels in the images recorded by the matrix camera (column 10, lines 40- 68, column 11, lines 1-49).

Allowable Subject Matter

5. Claims 5-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Other prior art cited

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Lo (US.5,408,424) discloses optimal filtering by recurrent neural networks.

Rogers et al., (US.5,999,639) discloses method and system for automated detection of clustered micro calcification from digital mammograms.

Unno et al., (US.5,473,532) discloses intelligent machining system.

Wood (US.4,842,411) discloses method of automatically measuring the shape of a continuous surface.


Doi et al., (US.5,790,690) discloses computer-aided method for automated image feature analysis and diagnosis of medical images.

Contact Information

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sheela C Chawan whose telephone number is 703-305- 4876. The examiner can normally be reached on Monday - Thursday 8 - 6.30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 703-308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Sheela Chawan
Patent Examiner
Group Art Unit 2625
Feb 16, 2005